Predicting the retention of first-time donors using an extended Theory of Planned Behavior

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ABSTRACT

BACKGROUND: Donor retention is vital to blood collection agencies. Past research has highlighted the importance of early career behavior for long-term donor retention yet, research investigating the determinants of early donor behavior is scarce. Using an extended theory of planned behavior (TPB), the current study sought to identify the predictors of first-time blood donors' early career retention.

STUDY DESIGN AND METHODS: First-time donors (N = 256) completed three surveys on blood donation. The standard TPB predictors and self identity as a donor were assessed three weeks (Time 1) and at four months (Time 2) after an initial donation. Path analyses examined the utility of the extended TPB to predict re-donation at 4- and 8- months post initial donation.

RESULTS: The extended TPB provided a good fit to the data. Post-Time 1 and 2 behavior was consistently predicted by intention to re-donate. Further, intention was predicted by attitudes, perceived control and self identity (Times 1 and 2). Donors' intentions to re-donate at Time 1 were the strongest predictor of intention to donate at Time 2, while donors' behavior at Time 1 strengthened self identity as a blood donor at Time 2.

CONCLUSION: An extended TPB framework proved efficacious in revealing the determinants of first-time donor retention in an initial 8-month period. The results suggest that collection agencies should intervene to bolster donors' attitudes, perceived control and identity as a donor during this crucial post-first donation period.

ABBREVIATIONS: CFI = comparative fit index; FIML = full information maximum likelihood; RMSEA = root mean square error of approximation; TPB = Theory of Planned Behavior; WLSMV = weighted least-squares estimator with a mean- and variance-adjusted chi-square test statistic; WRMR = weighted root mean squared residual.

INTRODUCTION

Donor retention is critically important to blood agencies worldwide. Repeat donors provide both a safe and stable supply of blood, allowing blood agencies to conserve valuable resources that would otherwise be spent on recruitment [1-5]. Despite these advantages, retention rates remain low. In Australia, approximately 60% of donors return within two years to donate again [5] and comparable figures have been observed overseas [6]. Research has established that initial donation experiences are crucial for establishing long-term retention. For example, donors experiencing vasovagal reactions have been repeatedly shown to be less likely to return again [7-9]. Moreover, the frequency of donation within the initial 12- [6] or 18-month [10] post-recruitment period reliably predicts longer-term retention.

Reflecting the frequent planned rather than spontaneous nature of blood donation, the Theory of Planned Behavior (TPB) [11] has been the model most often applied to blood donor behavior [3,12]. The TPB conceptualises new donor recruitment and early-career retention as the outcome of rational decisions. According to this model, intention is the principal determinant of behavior, which itself is determined by positive or negative evaluations of the behavior (attitude), perceptions of social pressure to perform the behavior (subjective norm), and perceptions of control over performing the behavior (perceived control). In general, these hypothesised relationships have been upheld in studies investigating donor motivation, although the influence of subjective norm has been more variable [3]. In the context of early career blood donation behavior, the predictors typically account for up to 72% of the variance in intention and up to 56% of the variance in behavior [3,12,13]. The core TPB model has been augmented with additional constructs that have enhanced its ability to predict donation intentions and behavior, including moral beliefs about donating, donation anxiety, and anticipated regret [4,13,14-19].

Researchers have also flagged self identity as a blood donor as a key driver of donors' transition from novice to committed donor [20-22]. According to identity theory, around the third [23], fourth [12,24,], or fifth [25] donation, identity as a blood donor becomes a salient, enduring part of a person's self, and becomes a *stronger* driver of donation behavior than attitudes, subjective norm, and perceived control [25]. However, the role that self identity as a donor plays in motivating early career donations remains unclear. Historically, donor research has typically differentiated samples only on the presence or absence of any donation history [3, 12]. As such, few studies have focused on the influence of self identity with early career donors with no prior donation history [15, 22 cf.,14]. In the two studies to date that stratified donors according to the number of prior donations [22,25], self identity emerged and remained a significant predictor of donation intentions for those who had donated once or twice [22] or twice or more [25]. Although limited by their cross-sectional designs, these results suggest that identity as a blood donor may start to form even after a single donation.

The transition from novice to committed donor has been conceptualised as a shift from rational decision-making to a behavior motivated by self-identification as a donor [3,22]. Despite the evidence of the importance of this initial period [6,10], to date, there have been limited efforts to study this transition, [19,23,26] (cf.[22,27,28]. Although some longitudinal studies have investigated factors predicting donation behavior over the short- to medium-term, such studies have typically measured these factors within a single timeframe and have not considered changes in motivation over time [c.f. 23]. Alternatively, cross sectional studies [22,25,28] have stratified donors according to the number of donations they have made. However, because different individuals made up each stratum, it is unclear whether observed differences across strata reflect growth in motivation, or simply attrition of less committed donors.

Given these limitations, we employed an extended TPB model to predict donors' behavior over the first eight months of their (potential) donation career. We assessed the factors comprising the core TPB model – attitudes, subjective norm, perceived control, and intentions – at multiple times over the eight-month period. In addition to these standard predictors, we also assessed self identity as a blood donor. This extended, longitudinal TPB model was tested using structural equation modeling, using a method similar to France et al., [13] and others [4,15].

Based on previous TPB research, we hypothesised after respondents' first donation, that attitude, subjective norm, and perceived control would influence donors' intentions to return, which in turn would predict actual donor behavior in the intervening four months (Time 1). In the subsequent four months (Time 2), we predicted that donation intentions and behavior may additionally be influenced by self identity. This hypothesis is consistent with the cross-sectional data that has shown a significant role of self identity on intention for donors with one or two [22] or two or more [25] prior donations and the literature that suggests an evolution of donors' motivation from being a largely rational decision-making process to an identity-driven one. We also anticipated that people who had donated at Time 1 would feel more positive attitudes towards donation, stronger normative pressure to donate, greater behavioral control, and stronger self identity as a donor. In addition, we expected that donors would partially rely on their earlier impressions when considering blood donation for a second time; hence, we hypothesised that Time 2 attitudes, subjective norm, perceived control, self identity and intentions would be influenced by their Time 1 counterparts.

MATERIALS AND METHODS

Participants and design

Participants were 256 (53 male, 201 female, 2 undisclosed) residents of Queensland, Australia who had donated blood once prior to commencing the study. Their ages ranged

from 16-65+ years, with the majority of participants falling in the 18-44 age range (62.5%). An invitation to participate in the study, by completing three surveys on blood donation, was made in writing by the Australian Red Cross Blood Service to 1,758 randomly selected first-time blood donors. Participants self-selected to take part in this study by accepting this invitation. The first survey was administered up to three week after the participant's first blood donation (Time 1), in order to capture participants' views about donation while the experience of their first donation was recent and therefore easier to recall. The second survey was administered four months later (Time 2) and the third (assessing behavior, Post-Time 2) 4 months after that. We opted to use a four month interval in order to give all participants the opportunity to donate again, as the Australian system requires a three month interval between donations. To aid retention each participant was given the opportunity to enter a prize draw to win one of ten $50 gift cards with the return of each of the three surveys. The majority of participants (52.8%) were married or in de facto relationships, and had either finished high school (50.8%) or had attended college/university (49.2%).

Measures

The surveys administered at Time 1 and Time 2 included items designed to assess the standard TPB constructs of attitudes, subjective norm, perceived control, and intention, which were developed following the guidelines proposed by Ajzen [11]. In addition, self identity as a blood donor was also measured using a scale based on Callero [20] and Terry et al. [29]. The items in each scale were identical across the Time 1 and Time 2 survey administrations, although the order of items was varied. Self-reported donor behavior was assessed post-Times 1 and 2 [4]. All multi-item measures had good internal reliability (all $\alpha > .72$, reliability coefficients are reported in Table 1). Composite measures were created such that higher scores indicated more positive or stronger levels of the construct. In addition to the

measured constructs, participants also answered demographic questions on age, gender, marital status, and level of education.

Attitude. Six 7-point semantic differential items were used to measure respondents' attitude towards donating blood in the next 4 months. These items were: *unpleasant/pleasant, bad/good, unsatisfying/satisfying, pointless/worthwhile, unrewarding/rewarding,* and *stressful/relaxing*.

Subjective norm. Subjective norm was measured using two items: "People who are important to me would recommend that I donate blood" and "People who are important to me would think I should donate blood," both scored 1 (*strongly disagree*) to 7 (*strongly agree*).

Perceived control. Two items measured perceived control: "I have complete control over whether I donate blood again or not in the next 4 months", scored 1 = *strongly disagree* to 7 = *strongly agree*) and "How much control do you have over whether you donate blood again or not in the next 4 months" (1 = *no control* to 7 = *complete control*).

Self identity. Self identity was measured using three items based on Callero [20] and Terry et al. [28]. "Blood donation is important to me", "I am like the kind of person who donates blood" and "Blood donation is an important part of who I am" all scored 1 (*strongly disagree*) to 7 (*strongly agree*).

Intention. Intention to donate blood again was assessed using two items: "I would like to become a regular donor" and "donating blood is something I would like to do regularly" both scored 1 (*strongly disagree*) to 7 (*strongly agree*).

Behavior. Blood donation behavior was assessed four months after each administration of the questionnaire at Time 1 and at Time 2. Participants were asked whether they had "visited a blood collection site in the past 4 months with the intention of donating blood," regardless of whether actual blood donation occurred. Responses to this question were scored 1 (*yes*) or 0 (*no*).

Statistical analysis

Correlational relationships among the potential predictors (attitude, subjective norm, perceived control, self identity, and intentions) and outcome variable (behavior) were initially investigated. Structural equation modelling (SEM) analyses were then performed using *Mplus 6.0*[30]. Because the behavioral outcome variable was dichotomous, the model was tested using a robust weighted least-squares estimator with a mean- and variance-adjusted chi-square test statistic (WLSMV). Four indices were used to assess the model's fit to the data: the chi-square statistic, the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the weighted root mean square residual (WRMR). Acceptable fit is indicated by a non-significant chi-square, a CFI above .95, an RMSEA below .08 [31], and a WRMR below .90 [30]. For the continuous predictor variables (of which less than 1% of the data was missing), the full information maximum likelihood (FIML) algorithm was used to impute missing values. For the dichotomous behavioral outcome variables, all available (i.e., pairwise present) data were used in the analyses.

RESULTS

Correlational Analyses

Table 1 presents correlations among the Time 1 and Time 2 variables, means and standard deviations. At Time 1, behavioral intention was correlated with all four predictor variables, with attitude and self identity having the strongest relationships. The strongest predictor of post-Time 1 donation behavior (i.e., occurring between the first and second survey administrations) was behavioral intention followed by self identity, subjective norm, and attitude; however, perceived control failed to predict behavior.

At Time 2, intention was correlated with three of the four predictor variables; perceived control and self identity had the strongest relationships. Intention was also correlated with all Time 1 predictors. The strongest predictor of post-Time 2 behavior (i.e.,

occurring after the second survey administration) was Time 2 intentions. The relationships with other Time 2 variables were non-significant. All of the Time 2 predictor variables were positively correlated with their Time 1 counterparts, intention at Time 1, and post-Time 1 donation behavior.

With few exceptions, the correlations among the demographic and study variables tended to be small and unsystematic. Level of education was negatively correlated with attitude (Times 1 and 2), perceived control (Time 1), subjective norm (Time 1 and 2), self identity (Times 1 and 2), and intentions (Time 1). Age was positively correlated with attitudes (Time 1), perceived control (Time 2), behavioral intentions (Time 2), and negatively correlated with subjective norm (Times 1 and 2). Married donors reported slightly more positive attitudes toward donations than unmarried donors (Time 1).

Test of the model

We tested the extended TPB model at Time 1 to determine whether it predicted return behavior (see Figure 1, Model 1). In this model, behavior was regressed on intention, which itself was regressed on attitude, subjective norm and perceived control. The overall model fit was good, $\chi^2(4) = 2.326$, $p = .676$, CFI = 1, RMSEA = 0, WRMR = .423. All of the predicted relationships were significant, with the exception of the relationship between subjective norm and intention (consistent with the variability observed in other studies [3]). This model accounted for 45.0% of the variance in intention and 10.1% in behavior.

In the second analysis (see Figure 2; Model 2), we assessed a longitudinal model of planned behavior that incorporated the Time 2 variables. The model at Times 1 and 2 was identical to the previous model, except the Time 2 variables were also regressed on their Time 1 counterparts. As the predictor variables at Time 2 were drawn from same-source data, we expected scores to be influenced by non-modelled factors, including participants' response styles and method variance arising from concurrent presentations of questions using

a similar response format. Based on this expectation, we permitted the error terms of these endogenous variables to be freely estimated, as opposed to imposing a covariance of zero. We tested the assumption of non-modelled influences on the Time 2 predictors by proposing a model in which the error term covariances had been fixed to zero. Inspection of the residual correlation matrix revealed substantial covariance not accounted for by the other predictors, indicating that an assumption of no covariance among the error terms was unjustified, and could have resulted in substantially inaccurate or inconsistent parameter estimates in the structural model [32,33]. In the final model, in which the covariances were freely estimated, the chi-square statistic was significant, $\chi^2(26) = 47.755$, $p = .005$; however, the other fit indices were within the range considered to be acceptable, CFI = .970, RMSEA = .058, WRMR = .830. All of the predicted paths at Time 1 remained significant.

At Time 2, donation behavior was predicted by intentions, but not behavior at Time 1. Intentions were in turn influenced by attitude, perceived control, and self identity, but not subjective norm. Each of the five Time 2 variables was significantly associated with its Time 1 counterpart. For perceived control, intention at Time 1 was also a significant predictor. Participants who donated post-Time 1 also reported stronger self identity at Time 2. In terms of the relationships among the error terms, the associations between self identity and attitude, subjective norm, and perceived behavioral control were significant, as was the association between attitude and subjective norm. This extended model accounted for 42.8% of the variance in intention at Time 2 and 40.5% of the variance in post-Time 2 behavior (see Figure 3).

DISCUSSION

The results of the current study revealed partial support for our proposed models. Consistent with the rational-process view of early donation behavior, intention to (re-) donate was consistently associated with donation behavior. Further, intention was consistently

predicted by attitudes and perceived control. The non-significant role of subjective norm in predicting intention observed is consistent with that seen in previous TPB blood donation research [3]. Partially consistent with our predictions, self identity as a blood donor played a significant role in predicting intention in the period following the initial donation (Time 1), and again four months later (Time 2). While the latter effect was predicted based on the previous research [25], the significant association between self identity and intention in the immediate period after donors' initial donation was not.

Donor research has typically not differentiated samples on the basis of stage of donor career [*cf*. 19,28], and as such, this potential early stage contribution of self identity to donor retention may have been overlooked. The association between self identity and intention to re-donate observed following participants' initial donation suggests this factor plays a key role in determining donor retention yet, it is unclear how this high level of early self identity emerges. In the context of blood donation, self identity has typically been proposed to emerge as a function of repeat donation behavior [21,22] with this evidenced in the current data with the positive association of post Time 1 behavior and Time 2 self identity. For those who have donated once, self identity as a blood donor may emerge as a function of their thoughts about their recent actions. As noted by Piliavin [21] and consistent with self-perception theory [34,35], in the absence of external factors such as coercion or reward, individuals attribute their actions to an internal disposition to behave in that way. For blood collection agencies, such an attribution is beneficial as donors will continue to act in a way that is consistent with this attribution [21].

Building the intention to return

While donor behavior remained determined by intention in this early career phase, a consideration of the determinants of this intention suggests the critical importance of this early post initial donation phase. The attitudes, perceived control and self identity as a blood

donor present in this initial 3 week period post-first donation determined donors' intentions and behavior over the next 8 months.

Given the evidence that donors' early impressions of donating influence their long-term behavior, these cognitions may provide targets for interventions. Consistent with market segmentation approaches to blood donor recruitment and retention [36-38], developing interventions to target the specific determinants of intention for new donors may boost retention over this initial 8 month period. Following the initial 4 month period, the results of the current study suggest a different strategy may be required. Specifically, rather than marketing to boost positive attitudes towards blood donation, efforts should be concentrated on building donors' perceptions of control over their behavior and their self identity as a blood donor. Previous analyses of donation patterns in the 1 or 1.5 year period after the initial donation suggests that retention for just one further donation in this period will yield a substantial gain in the proportion of this first-time donors who go on to become committed or regular donors [6,10].

Conclusions

In exploring the determinants of first-time donor retention over an extended period using an extended TPB, the current study provides a unique insight into the psychological motivators of donor retention in this critical initial period. However, future replication of the model identified in the current study with more evenly distributed and larger samples of donors using standardised measures of constructs is critical. Such a replication may help clarify some of discrepancies seen in the analysis of the current data in comparison to past analyses. In the current study, while 40.5% of variance in post-Time 2 behavior was accounted for, the Time 1 predictors accounted for only 10.1% of the variance in behavior at Time 2. This is in contrast to previous TPB-based research in which up to 56% of the variance in donors' behavior has been accounted for by TPB-based predictors [3,12,13].

While the reason for this discrepancy is not clear from the current data, one possibility is that it may have occurred due to the use of 'mixed' samples in previous analyses (comprising both first time and more experienced donors). As such, a more extensive assessment of the basic and extended TPB model with first-time donors should be conducted.

Within such a replication the role of moral norms [14,16-18,28] and the affective outcomes associated with donating blood [4,25,29,38] should – as a minimum -- be considered. The inclusion of constructs from other theories that have been applied to blood donation [27,39] may also serve to provide a more comprehensive picture of the factors key to early-career donor retention. Within such research, although self-reported and record-linked donation behavior have been shown to be strongly correlated [40], using blood collection agency donation records to verify donors' reported behavior would strengthen the conclusions that could be drawn. Further, to maximise the comparability with the prior analyses that have identified donation behavior within this initial period as critical for long-term donor retention, a longer follow-up period (up to 1.5 years)[10] should be employed. While the current analysis provides an insight into the methods that can be employed to track shifts in donor motivation a longer-term follow up would, theoretically, allow the theorised complete shift in motivation for blood donation that occurs at around the third to fifth donation [12,23-25] to be documented for the sub-sample of donors who engage in frequent blood donation during this period.

These limitations aside, the results of this study provide insight into some of the factors that may be specifically targeted by blood collection agencies in interventions or strategic marketing to improve donor retention in this critical initial period. While previous analyses have considered TPB predictors [28] augmented by self identity [25] in stratified samples, the current study represents the first attempt to document how predictors of blood donation may evolve for donors within the early career phase. Acknowledging that donor

retention remains critical to the maintenance of the blood supply worldwide, marketing to increase blood donation behavior during this period has the potential to both alter the donors' motives for donation behavior [21,34] and, through generating committed donors, provide long-term stability in the blood supply.

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Table 1. Descriptive statistics and zero-order correlations among TPB variables, self identity and behavior across Times 1–3 (n = 253)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Time 1																	
1. Attitude	.88§	.34*	.21*	.44*	.60*	.18‡	.41*	.27*	.18†	.43*	.45*	.17	-.10	.20†	.12‡	-.12‡	-.15
2. Perceived Control		.81	.17†	.22*	.35*	.10	.20*	.25*	.13‡	.21*	.26*	.41†	.00	.04	.02	-.13‡	-.22
3. Subjective Norm			.76	.46*	.25*	.19‡	.20†	.10	.70*	.37*	.16†	-.08	-.06	-.18†	-.01	-.15‡	-.06
4. Self identity				.72	.49*	.25*	.38*	.16†	.40*	.68*	.40*	.07	.08	.00	.05	-.22*	-.03
5. Behavioral Intention					.9	.32*	.35*	.26*	.25*	.36*	.58*	.34‡	-.15	.09	-.01	-.13‡	-.10
6. Donation Behavior (post T1)						n/a	.23†	.17‡	.21†	.28*	.28*	.37‡	-.13	.07	.02	-.07	.10
Time 2																	
7. Attitude							.92	.11	.36*	.45*	.37*	-.03	-.04	.08	-.05	-.15†	.01
8. Perceived Control								.87	.09	.24*	.55*	.26	-.23	.16‡	-.02	-.09	-.10
9. Subjective Norm									.83	.43*	.29*	-.06	-.03	-.13‡	-.08	-.13‡	-.12
10. Self identity										.74	.51*	.08	.06	.06	.03	-.24*	.01
11. Behavioral Intention											.87	.48*	-.10	.18‡	-.02	-.08	-.23
12. Donation Behavior (post T2)‖												n/a	-.39	.19	.06	-.24	-.11
Demographic variables																	
13. Gender¶													n/a	-.11	.10	.12	.02
14. Age														n/a	.38*	-.07	-.39†
15. Marital Status**															n/a	.04	-.23‡
16. Education																n/a	-.14
17. Prior Receipt of Transfusion																	n/a
Mean	6.37	6.64	5.49	6.31	6.59	63.3%	6.02	6.21	5.32	6.29	6.32	77.8%	n/a	32.30	n/a	n/a	n/a
Standard Deviation	.76	.67	1.61	.80	.86	donated	1.27	1.36	1.62	.81	1.34	donated	n/a	17.90	n/a	n/a	n/a

* $p < .001$.
† $p < .01$.
‡ $p < .05$.
§ Cronbach's alpha reliability coefficient is reported in the diagonal
‖ *n* = 90 for this variable, due to participant attrition after the Time 2 survey administration
¶ This variable was coded: 1 = male, 2 = female
** This variable was coded: 1 = currently married or in a de facto relationship, 0 = not currently married or in a de facto relationship

Table 2. Models 1 and 2 Standardized Path Coefficients

Paths	Model 1	Model 2
Attitude (T1) -> Intention (T1)	.428*	.433*
Subjective Norm (T1) -> Intention (T1)	.006	-.006
Perceived Control (T1) -> Intention (T1)	.141*	.140*
Self identity (T1) -> Intention (T1)	.283*	.286*
Intention (T1) -> Behavior (post-T1)	.317†	.323*
Attitude (T1) -> Attitude (T2)	n/a	.266†
Intention (T1) -> Attitude (T2)	n/a	.118
Behavior (post-T1) -> Attitude (T2)	n/a	.072
Subjective Norm (T1) -> Subjective Norm (T2)	n/a	.670*
Intention (T1) -> Subjective Norm (T2)	n/a	.042
Behavior (post-T1) -> Subjective Norm (T2)	n/a	.050
Perceived Control (T1) -> Perceived Control (T2)	n/a	.175†
Intention (T1) -> Perceived Control (T2)	n/a	.111‡
Behavior (post-T1) -> Perceived Control (T2)	n/a	.122
Self identity (T1) -> Self identity (T2)	n/a	.634*
Intention (T1) -> Self identity (T2)	n/a	-.055
Behavior (post-T1) -> Self Identity (T2)	n/a	.115‡
Intention (T1) -> Intention (T2)	n/a	.308*
Attitude (T2) -> Intention (T2)	n/a	.455‡
Subjective Norm (T2) -> Intention (T2)	n/a	-.082
Perceived Control (T2) -> Intention (T2)	n/a	.417‡
Self Identity (T2) -> Intention (T2)	n/a	.200†
Intention (T2) -> Behavior (post-T2)	n/a	.530†
Behavior (post-T1) -> Behavior (post-T2)	n/a	.230

* $p < .001$.
† $p < .01$.
‡ $p < .05$.

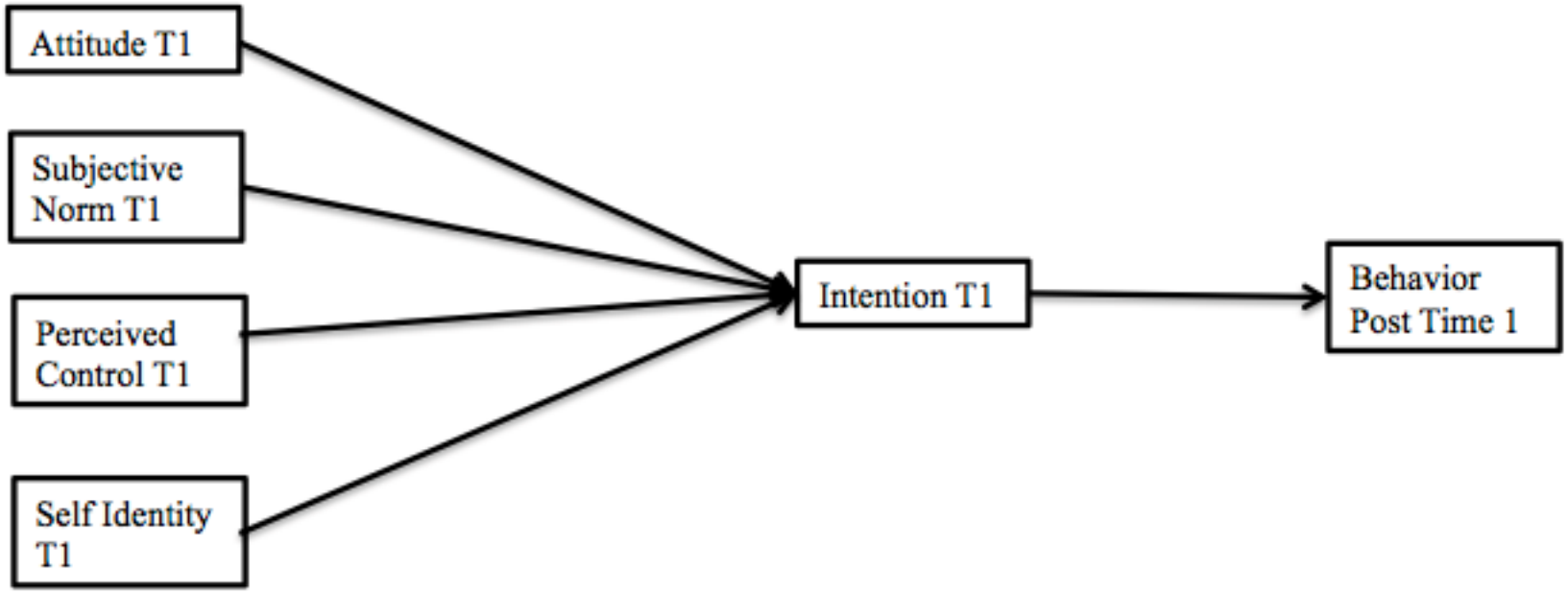

FIGURE 1. Basic Theory of Planned Behavior Model (Model 1)

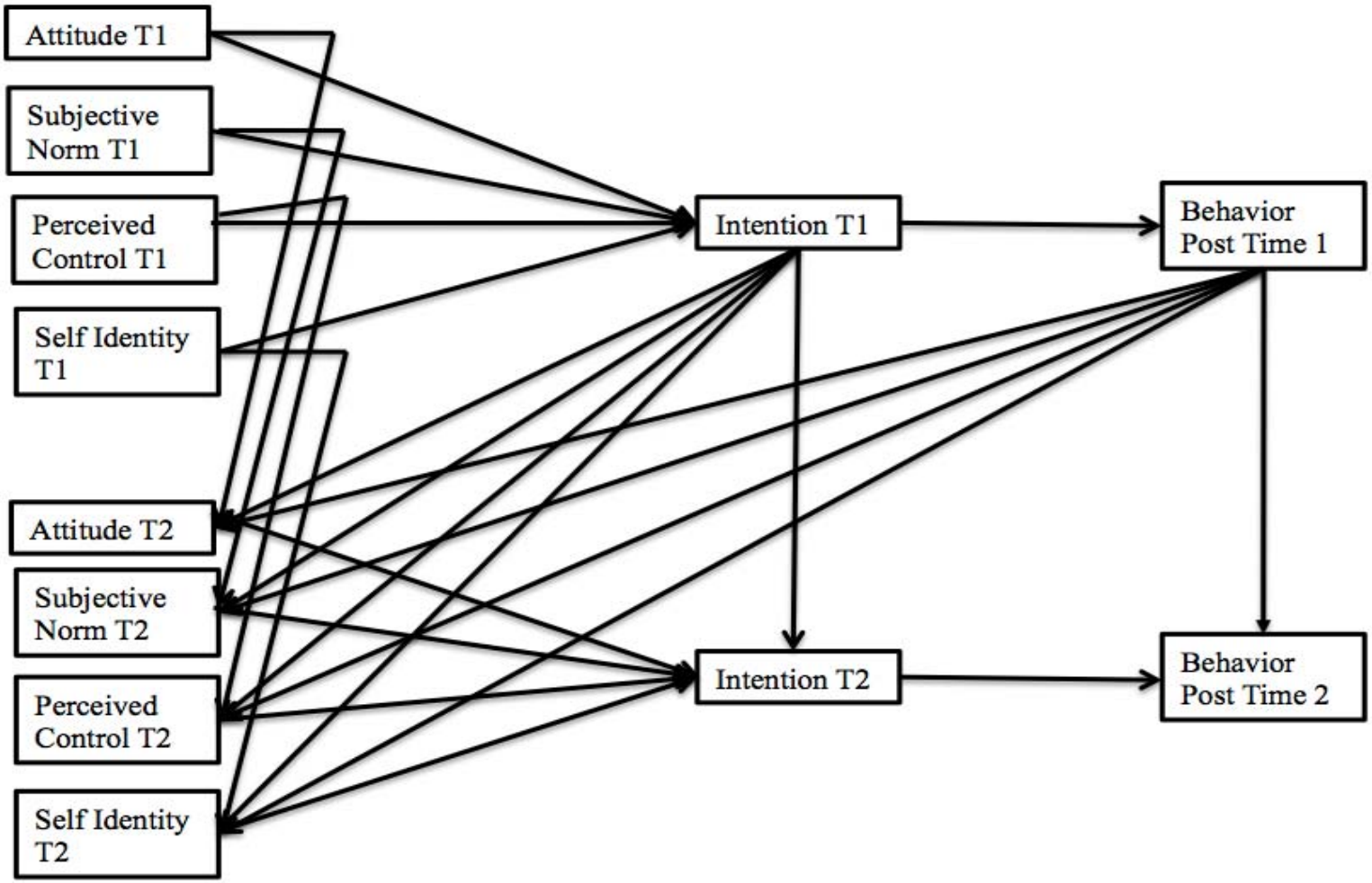

FIGURE 2. Longitudinal Theory of Planned Behavior Model (Model 2)

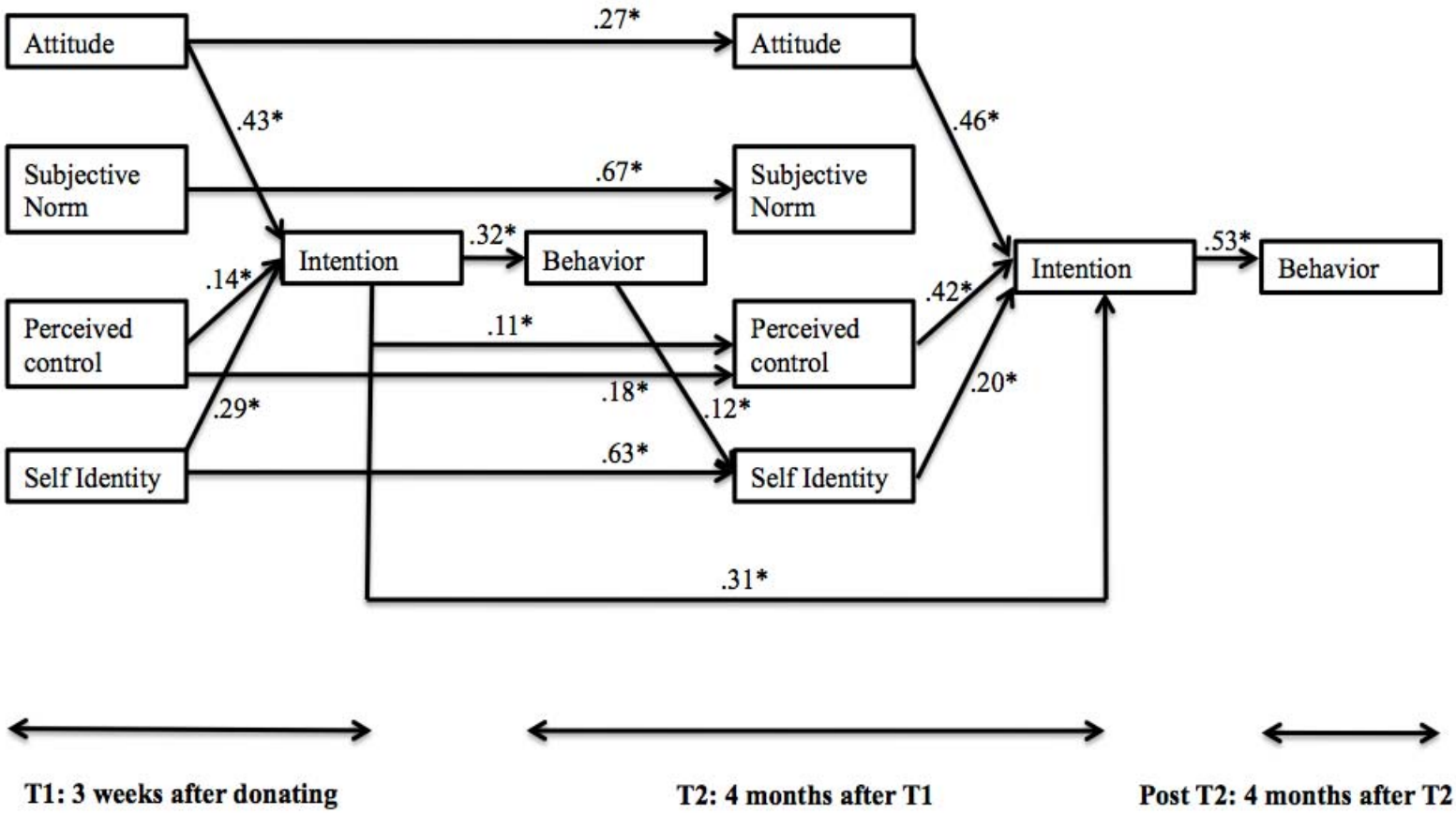

FIGURE 3. Simplified longitudinal Theory of Planned Behavior Model (Model 2); * p < .05